Claims

1. A process for the production niobium monoxide powder **characterized by** comprising two reduction steps of niobium oxide, the first step comprises reducing by hydrogen of niobium pentoxide to niobium dioxide, and the second step comprises reducing niobium dioxide to niobium monoxide, by using an oxygen getter material and in an atmosphere which allows the transfer of the oxygen atoms from the niobium dioxide to the getter material, wherein the getter material can be a refractory metal or a reactive metal or a refractory metal or a reactive metal hydride.

2. A process for the production of niobium monoxide powder, according to claim 1, **characterized in that** the first reduction step is conducted at a temperature between 700°C and 1500°C, and preferably between 800°C and 1200°C, for periods of time varying from 15 to 300 minutes, and preferably between 30 and 180 minutes.

3. A process for the production of niobium monoxide powder, according to claim 1, **characterized in that** the first reduction step is conducted in an atmosphere of hydrogen gas or a combination of hydrogen gas and other inert gasses at various ratios, such as, argon, helium and nitrogen.

4. A process for the production of niobium monoxide powder, according to claim 1, **characterized in that** the first reduction step is conducted in an atmosphere of carbon monoxide or any other gas or gaseous mixture having an adequate reducing potential.

5. A process for the production of niobium monoxide powder, according to claim 1 **characterized by** producing in the first reduction step the niobium dioxide with a microporous structure, with a specific surface area

between 0.5 m^2/g and 20 m^2/g.

6. A process for the production of niobium monoxide powder, according to claim 1, **characterized by** producing in the first reduction step the niobium dioxide with a microporous structure, with at least 41 per cent porosity.

7. A process for the production of niobium monoxide powder, according to claim 1, **characterized by** producing in the first reduction step the niobium dioxide with a microporous structure, with low residual content of niobium pentoxide.

8. A process for the production of niobium monoxide powder, according to claim 1, **characterized by** using in the second reduction step the niobium dioxide with a specific surface area between 0.5 and 20 m^2/g.

9. A process for the production of niobium monoxide powder, according to claim 1, **characterized by** using in the second reduction step the niobium dioxide with at least 41 per cent porosity.

10. A process for the production of niobium monoxide powder, according to claim 1, **characterized by** using as oxygen getter material in the second reduction step the niobium metal and alloys thereof, and/or niobium metal and its alloys hydride thereof in the form of powder.

11. A process for the production of niobium monoxide powder, according to claim 1, **characterized by** using as oxygen getter material in the second reduction step the tantalum metal and alloys thereof, and/or tantalum metal and its alloys hydride thereof in the form of powder.

12. A process for the production of niobium monoxide powder, according to claim 1, **characterized in that** the atmosphere that allows the transfer of the oxygen atoms in the second reduction step is comprised of hydrogen gas, and may contain other gasses that do not lower the reducing

potential of the hydrogen gas.

13. A process for the production of niobium monoxide powder, according to claim 1, **characterized in that** the atmosphere of the second reduction step is comprised of hydrogen gas and nitrogen in such a way that allow the nitrogen doping of the formed niobium monoxide.

14. A process for the production of niobium monoxide powder, according to claim 1, **characterized in that** the second reduction step is conducted at a temperature between 1000°C and 1700°C, and preferably between 1200°C and 1600°C, for periods of time between 10 minutes and 720 minutes, and preferably between 30 minutes and 360 minutes.

15. A process for the production of niobium monoxide powder, according to claim 1, **characterized in that** the niobium monoxide that is produced does not contain detectable residual amounts of niobium dioxide or metallic niobium by X-ray diffraction.

16. A process for the production of niobium monoxide powder, according to claim 1, **characterized in that** the niobium monoxide produced in the second reduction step has similar morphology of the niobium dioxide.

17. A process for the production of niobium monoxide powder, according to claim 1, **characterized in that** the niobium monoxide produced in the second reduction step has an atomic ratio between niobium and oxygen between 1:0.6 e 1:1.5 and preferably an atomic ratio between niobium and oxygen between 1:0.7 and 1:1.1.

18. Niobium monoxide, produced in accordance with claim 1, **characterized by** presenting a residual content of up to 5 per cent of niobium dioxide.

19. Niobium monoxide, produced in accordance with claim 1,

characterized by presenting a residual content of up to 5 per cent of niobium metal.

20. Niobium monoxide, produced in accordance with claim 1, **characterized by** presenting a residual content of up to 5 per cent of niobium dioxide and a residual content of up to 5 per cent of niobium metal.

21. Niobium monoxide, produced in accordance with claim 1, **characterized by** having a specific surface area from 0.5 to 20.0 m^2/g, preferably from 0.8 to 6.0 m^2/g.

22. Niobium monoxide, produced in accordance with claim 1, **characterized by** having a microporous structure with at least 41 per cent porosity.

23. A capacitor, manufactured with niobium monoxide produced according to claim 1, **characterized by** having a capacitance between 50,000 CV/g and 200,000 CV/g.

24. A capacitor, manufactured with the niobium monoxide produced according to claim 1, **characterized by** having a leakage current value below 1.0 nA/CV